

WHAT IS CLAIMED IS:

Sub A. 1. A method of removing, as an unnecessary film, an unnecessary portion of a coating film formed on a surface of a substrate as a substrate surface, comprising:

covering said substrate surface with a cover member having a top;
supplying a solvent from the top of said cover member through a supply hole formed at a predetermined position of said cover member; and
dissolving said unnecessary film by said solvent ;

the cover member defining a gap between an inner surface thereof and said substrate surface,

said substrate surface having an unprocessed region where said coating film is to be left as a necessary film and a processed region where said coating film is to be removed as said unnecessary film, and

said gap in said unprocessed region having a size such that temperature distribution is not caused in said coating film under influence of heat transfer from said cover member.

2. A method of removing, as an unnecessary film, an unnecessary portion of a coating film formed on a surface of a substrate as a substrate surface, comprising :

covering said substrate surface with a cover member having a top;
supplying said solvent from the top of said cover member through a supply hole formed at a predetermined position of said cover member; and
dissolving said unnecessary film by said solvent;

the cover member defining a gap between an inner surface thereof and said substrate surface,

said substrate surface having an unprocessed region where said coating film is to be left as a necessary film and a processed region where said

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coating film is to be removed as said unnecessary film,

said gap in said unprocessed region having a size such that temperature distribution is not caused in said coating film under influence of heat transfer from said cover member, and

temperature distribution is not caused in said coating film formed on a principal surface of said substrate due to convection of gas produced in said gap.

3. A method as claimed in claim 1 or 2, wherein:

said gap has a constant or fixed size in said unprocessed region .

4. A method as claimed in any one of claims 1 through 3, wherein:

said gap has a size selected so that said solvent supplied to said gap is allowed to pass through said gap and spread in said gap in said processed region.

5. A method as claimed in any one of claims 1 through 4, wherein:

a string-like member having a predetermined thickness is interposed between the inner surface of said cover member and said substrate surface to serve as a gap defining member for defining a size of said gap between the inner surface of said cover member and said substrate surface in said processed region.

6. A method as claimed in any one of claims 1 through 5, wherein:

said unnecessary film is dissolved and removed by said solvent supplied through said supply hole while said substrate and said cover member are rotated together.

7. A method as claimed in any one of claims 1 through 6, wherein:

said solvent is supplied from the top of said cover member and also supplied from a rear side of said substrate towards said processed region.

8. A device for removing, as an unnecessary film, an unnecessary

portion of a coating film formed on a surface of a substrate as a substrate

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surface by dissolving said unnecessary film with a solvent, comprising:

a cover member covering said substrate surface and having a top; and
a solvent supply unit for supplying said solvent from the top of said cover member;

the cover member having a supply hole through which said solvent from said solvent supply unit is supplied to said unnecessary film to thereby dissolve and remove said unnecessary film;

the cover member defining a gap between an inner surface thereof and said substrate surface,

said substrate surface having an unprocessed region where said coating film is to be left as a necessary film and a processed region where said coating film is to be removed as said unnecessary film,

said gap in said unprocessed region having a size such that temperature distribution is not caused in said coating film under influence of heat transfer from said cover member and that temperature distribution is not caused in said coating film due to convection of gas produced in said gap.

9. A device as claimed in claim 8, wherein:

said gap has a constant or fixed size in said unprocessed region.

10. A device as claimed in claim 8 or 9, wherein:

said gap has a size selected so that said solvent supplied to said gap is allowed to pass through said gap and spread in said gap in said processed region.

11. A method of manufacturing a photo mask blank, comprising:

depositing a film having a light shielding function and/or a phase shift function and a resist film on a light transmitting substrate, and

removing as an unnecessary film, an unnecessary portion of said resist film by the method claimed in any one of claims 1 through 7, the unnecessary film being formed in the deposition step.

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12. A method as claimed in claim 11, wherein:

the unnecessary film is formed on at least a surface peripheral region and a side surface region of the substrate, and

the unnecessary film is removed in said unnecessary film removing step.

13. A method as claimed in claim 12, wherein:

the unnecessary film is formed on a back surface of the substrate, and the unnecessary film is removed in said unnecessary film removing step.

14. A method as claimed in claim 11, wherein:

the film having the light shielding function and/or the phase shift function is formed by sputtering or vapor deposition, and the resist film is formed by coating.

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